CS 215 - Fundamentals of Programming II
Fall 2019 - Homework 2
10 points

Out: August 30, 2019
Due: September 5, 2019 (Friday)

This is a written homework assignment. **Turn in a hardcopy (either handwritten or printed out) of your answers to the instructor by 4:30pm on the due date for full credit.** If the instructor is not in her office, leave it in the box outside the office door.

1. (5 points) Consider the following program and answer the questions on the next page:

```cpp
// Function prototype
void sum_diff (int num1, int num2, int& num3, int& num4);

int main ()
{
   using namespace std;

   int w, x, y, z;

   x = 1;
   y = 3;
   z = 5;
   w = 4;

   cout << "   x   y   z   w" << endl;

   cout << "   " << x << "   " << y
        << "   " << z << "   " << w << endl;

   sum_diff (x, y, z, w);
   cout << "   " << x << "   " << y
        << "   " << z << "   " << w << endl;

   sum_diff (z, w, y, x);
   cout << "   " << x << "   " << y
        << "   " << z << "   " << w << endl;
   return 0;
} // end main

// Function definition
void sum_diff (int num1, int num2, int& num3, int& num4)
{
   num3 = num1 + num2;
   num4 = num1 - num2;
} // end sum_diff
```

a) Which variables are value parameters? Which variables are reference parameters?
b) What is the difference between a value parameter and a reference parameter?
c) What is the difference between a parameter and an argument?
d) Which variables are arguments?
e) What is displayed on the screen by this program? Note there are 4 lines of output.

2. (5 points) a. Write a C++ definition (i.e., the entire implementation, not just a prototype) for a function **sum_n_avg** that *receives* three numbers and ***passes back*** the sum and the average of the three received numbers.

b. Assume the following main program. Write the **sum_n_avg** function call that will compute the sum and average of the three entered numbers so that the program will run correctly.

```
int main ()
{
   using namespace std;

   double one, two, three, sum_of_3, avg_of_3;

   cout << "Enter three numbers (separated by a space): ";
   cin >> one >> two >> three;

   // What function call would go here?

   cout << "The sum of the numbers is " << sum_of_3 << endl;
   cout << "The average of the numbers is " << avg_of_3 << endl;

   return 0;
}
```